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BIOLOGICAL EVALUATION OF PINE MORTALITY AT ZACA LAKE, SANTA BARBARA RANGER DISTRICT, LOS PADRES NATIONAL FOREST

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ABSTRACT

The western pine beetle, Dendroctonus brevicomis, is killing numerous Coulter pines, Pinus coulteri, in the vicinity of Zaca Lake, Santa Barbara Ranger District, Los Padres National Forest. Annosus root disease caused by Heterobasidion annosum, subnormal precipitation, site, fire exclusion, and succession to oak climax are contributing factors.

INTRODUCTION

On May 25, James Allison, plant pathologist, and I accompanied Dave Schreiner, silviculturist, to Zaca Lake on the Santa Barbara Ranger District, Los Padres National Forest. Zaca Lake is a natural lake within a small parcel of private land on the District. Numerous Coulter pines around and within the parcel have died. Mortality was of concern to the manager of Zaca Lake Resort as well as the Los Padres National Forest.

OBSERVATIONS

The western pine beetle, Dendroctonus brevicomis, is causing substantial mortality in Coulter pine, Pinus coulteri, located near Zaca Lake on the Santa Barbara Ranger District. At the head of the valley above the lake are two group kills of about 25 and 60 trees. West of the lake occur smaller groups of 5 to 15 trees. These spots frequently occur on small ridges. More extensive mortality is located around a dry lake bed downstream from Zaca Lake. Most of the larger pines on the southeast aspect at the west end have been killed. This is a marginal site of shallow soils and rock outcrops rated at a Dunning IV or V.

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A forest of live oak, Coulter pine and some white oak and incense-cedar occur upslope from the south side of the dry lake bed. Many pine stumps occur at the lake bed edge, but frequency decreases upslope until only dead snags are found. The number of pines in the overstory is probably half of the number on the site 10 to 15 years ago. Death of the pines has not produced many openings in the oak canopy. As a result, few pine seedlings or saplings exist and a small portion of these were dead or dying. All were near old pine stumps.

Conks of Heterobasidion annosum (Fomes annosus) were quite common within stump cavities; so much so, that the occurrence was reminiscent of the ease with which annosum conks are often found in true fir stumps. Conks are frequently difficult to find in pine stumps even under the most suspicious of circumstances. Because of the numerous oaks, circular openings characteristic of root disease centers affecting the conifers were not readily apparent.

Many of the pines are infected with dwarf mistletoe, Arceuthobium campylopodum, but none with a rating greater than 4 on the Hawksworth scale. However, in dry years infections levels of 3 and 4 may produce increased susceptibility to successful beetle attacks. True mistletoes were present on oaks, but decline was not apparent.

DISCUSSION

Recent shortages in precipitation and poor site have dictated the biological rotation at the west end of the dry lake bed. Bark beetles have been the instrument. It will be decades before young pines grow to dominate the site.

Bark beetle attacks on pines stressed by annosus root disease are hastening plant succession on the south side of the dry lake. Without an intervening site disturbance to perpetuate the pine, oaks soon will completely dominate the stand and only scattered pines will remain. The climax vegetation is not pine, and the exclusion of fire is enhancing the diminution of seral species.

MANAGEMENT ALTERNATIVES

1. No Action. Pines will continue to die whenever stress from drought, root disease, dwarf mistletoe, overstocking or a combination of these provide opportunities for successful attack by the western pine beetle. Dense stands along ridges extending down into the basin appear the most susceptible to mortality. Oaks and other hardwood vegetation will become even more dominant without disturbance.

2. Borax Treatment. The locations of current mortality and stumps indicate that annosus root disease may be largely confined to the lower slope on the south side of the dry lake. Stumps created in future cutting should be treated with borax to prevent the establishment of additional disease centers. This practice would be beneficial within the private holding also.

3. Silvicultural. Reduced stocking would decrease the probability of beetle attack. However, this might require the removal of some oaks, and without sprouting, could encourage another root disease, Armillaria root rot. Oaks are

the climax species at the dry lake site and serve a number of beneficial watershed and wildlife uses. Emphasis on conifer management might be better served on the upper slopes of the basin. Slash should be properly treated to prevent the buildup of pine engraver populations.

4. Protective Insecticide Treatment. Two formulations of carbaryl insecticide (Sevin™ 50W and 80S) are registered for use on pines to prevent attacks by bark and engraver beetles. A single application to the main stem by hydraulic sprayer from the ground will prevent most attacks for up to a year. If the insecticide is applied in response to a temporary, reversible stress, such as drought or construction disturbance, it could be considered a logical part of an integrated pest management program.